Amendments to the claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A method for controlling gas cooling in a gas pipeline having a heat exchanger at a compressor station, the method comprising the steps of:

A) obtaining observations of parameters that are characteristic of gas flow through the compressor station under a set of operating conditions having a corresponding energy cost;

B) from the observations of step A, determining a balance between gas cooling and heat exchanger gas pressure loss that results in an improvement of energy savings by comparison with the energy cost of the set of operating conditions; and

C) operating a bypass valve on the gas pipeline to divert an amount of gas into the heat exchanger that achieves the balance determined in step B.

2. (Original) The method of claim 1 in which the method steps A and B are carried out in a controller operably connected to the bypass valve.

3. (Original) The method of claim 1 in which method step B uses an algorithm derived from a mathematical model of the heat exchanger, compressor station and gas pipeline.

4. (Original) The method of claim 1 in which the determination of step B results in optimization of energy savings.

5. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the

outlet of the heat exchanger, ambient air temperature and pressure, gas temperature downstream of heat exchanger piping and heat exchanger bypass piping junction, the heat exchanger bypass valve position (i.e. degree of opening), gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, gas pressure loss across the heat exchanger gas flow meter, gas pressure loss across the station gas flow meter, gas pressure at the station gas flow meter, actual (double redundant) gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station, and heat exchanger fouling.

6. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, gas temperature downstream of heat exchanger piping and heat exchanger bypass piping junction, the heat exchanger bypass valve position (i.e. degree of opening), gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, gas pressure loss across the station gas flow meter, gas pressure at the station gas flow meter, actual (redundant) gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station, and heat exchanger fouling.

7. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, gas temperature downstream of heat exchanger piping and heat exchanger bypass piping junction, the heat exchanger bypass valve position (i.e. degree of opening), gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, gas pressure loss across the heat exchanger gas flow meter, actual (redundant) gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station, and heat exchanger fouling.

8. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, gas temperature downstream of heat exchanger piping and heat exchanger bypass piping junction, the heat exchanger bypass valve position (i.e. degree of opening), gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, actual gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station, and heat exchanger fouling.

9. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, gas temperature downstream of heat exchanger piping and heat exchanger bypass piping junction, gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, gas pressure loss across the station gas flow meter, gas pressure at the station gas flow meter, actual gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station, and heat exchanger fouling.

10. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, gas temperature downstream of heat exchanger piping and heat exchanger bypass piping junction, gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, gas pressure loss across the heat exchanger gas flow meter, actual gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station, and heat exchanger fouling.

11. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, gas temperature

downstream of heat exchanger piping and heat exchanger bypass piping junction, gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, and estimated gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station.

12. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, the heat exchanger bypass valve position (i.e. degree of opening), gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, gas pressure loss across the station gas flow meter, gas pressure at the station gas flow meter, actual gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station, and heat exchanger fouling.

13. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, the heat exchanger bypass valve position (i.e. degree of opening), gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, gas pressure loss across the heat exchanger gas flow meter, actual gas flow rate through the heat exchanger, heat exchanger bypass valve and compressor station, and heat exchanger fouling.

14. (Original) The method of claim 1 in which the observations of step A comprise gas temperature at the inlet of the heat exchanger, gas temperature at the outlet of the heat exchanger, ambient air temperature and pressure, the heat exchanger bypass valve position (i.e. degree of opening), gas pressure at the inlet of the heat exchanger, gas pressure loss across the heat exchanger, estimated gas flow rate through the heat exchanger and compressor station, and actual gas flow rate through the heat exchanger bypass valve.